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THE OCCURENCE OF *MUSCINA PASCUORUM* MEIGEN IN NORTH AMERICA IN 1922.[1]

(Presented Dec. 26, 1922, at the Boston meeting of the Entomological Society of America.)

By Charles W. Johnson.

Boston Society of Natural History.

The increase and spread of this European fly in such numbers and over so wide an area, before its presence was actually discovered, was a great surprise, especially to the dipterist. The first specimens to come under my observation were received on October 10, among some Diptera collected by Dr. W. M. Wheeler, at Colebrook, Connecticut. The three specimens were taken, August 10, 18 and 21. A few days later I received a box of flies from Mr. K. F. Chamberlain, of Cornwall Bridge, Conn., and among them was a specimen collected August 6, the earliest record I have for the species. Mr. R. T. Webber found among the material collected at the Bound Brook nurseries, N. J., a specimen taken September 1. Professor C. T. Brues observed it in numbers both in his house and about a neighboring cider mill at Petersham, Mass., October 8. Mr. F. H. Walker collected two specimens at Marblehead, Mass., October 15. A few days later I received five specimens from Mrs. Ella L. Horr of the Worcester Natural History Society. Mrs. Horr said they were abundant in the cupola of the building and that the janitor said they were there in September, but that she did not happen to go there until about October 21. I wrote her that the fly was new to me and that I should like very much to have some more specimens. No males had been seen and I was doubtful in which of two European species to place it. On October 25, Mrs. Horr wrote to me that she had sent some to Washington and on the 26th sent me 51 specimens. I wrote to Dr. J. M. Aldrich in

regard to the matter and on November 1 he replied as follows: "It is *Muscina pascuorum* Meigen. I have compared it with European specimens determined by several authorities, and hence there is no doubt of what it is."

On October 27 I took two specimens on the window at my home in Brookline and on the 31st I received several specimens from Mrs. L. C. Marshall, of East Walpole, who said they were abundant in her house. On November 1, Dr. G. M. Allen captured a specimen in his house in Cambridge. On the 3d Dr. F. T. Lewis brought in seven specimens taken at Waban, Newton, and on the same date Dr. J. A. Cushman collected a specimen at Sharon. On the 7th a specimen was taken on a window at the Boston Society of Natural History, and on the 8th Dr. Lewis took a specimen at the Harvard Medical School, Boston. These single specimens indicate that they were by no means common in the city. On the 7th Dr. Cushman collected at Sharon nine specimens, among which was a male, the first I had seen. Dr Cushman then made three collections at Sharon, which are interesting in showing the relative proportion of this and the other species that normally frequent houses in the autumn.

November 12, 46 *Muscina pascuorum* (all females), 30 *M. assimilis*, 19 *Pollenia rudis*, 10 *Phormia regina*, 1 *Cynomyia cadavorina*, and 1 *Musca domestica*.

November 16, 22 *M. pascuorum*, 12 *M. assimilis*, 15 *P. rudis*, and 2 *P. regina*.

November 26, 13 *M. pascuorum*, 11 *P. rudis*, and 5 *P. regina*.

Another interesting series showing the relative abundanc of this species was made by Mr. F. H. Walker in the attic of a summer cottage at Asbury Grove, Mass. November 9, he collected 275 *Muscina pascuorum* (2 males), 21 *Pollenia rudis*, 15 *Phormia regina*, and 1 *M. assimilis*. Mr. Walker says: "I could have obtained thousands from neighboring cottages. The skylight from which I obtained these flies measured 22 by 36 inches."

The following additional records show how abundant and generally distributed the species is throughout eastern Massa-

chusetts On November 10 Mr. M. T. Smulyan took a specimen at Melrose Highlands; on the 11th Mr. A. P. Morse captured a number at Ipswich; and on the 12th at Wellesley. On the 13th Mr. W. L. Maxcy reported it as abundant in his house at Stillwater. On the 14th I caught the second male on a window in Brookline, and on the same date Mr. R. T. Webber reported it from Dover, and Mr. G. W. Barber from Arlington. On the 15th Miss Margaret Hayden collected it at Ashland; on the 18th Mr. C. V. Blackburn obtained it at Stoneham; on the 19th Mr. L. W. Jenkins secured it at Putnamville. On the 30th Mr. S. N. F. Sanford caught a specimen at Fall River, and on Dec. 2 Dr. G. M. Allen captured two at Cohasset.

Correspondence, together with a note published in Science (November 24), has further added to our knowledge of its distribution. Under date of November 14, Dr. W. E. Britton, of the Connecticut Agricultural Experiment Station, New Haven, writes: "We have noticed a number of large-sized flies around the windows and have killed some of them. We paid little attention to the species, but there are now some dead ones around the place and I will have some of them relaxed, pinned, and sent to you." I received the flies, November 21 and they were all *M. pascuorum*. Dr. H. T. Fernald, of Amherst, Mass., writes, "Answering your letter of Nov. 17, I may say that we have noticed a species of Muscina on our windows this fall and took specimens first on Oct. 12, though they were present considerably before that date. We are referring it to *Muscina pabulorum* Meig. I should be very glad to know whether we are on the right track." Under date of November 28, Dr. Fernald again writes: "Many thanks for your letter of Nov. 27. It has been reasonably abundant here, and was certainly present for at least a week or ten days before we thought of taking and actually dating a specimen. I have not heard of it from any other part of the state mainly because nobody appears to pay any attention to flies which show up on house windows."

In a letter from Dr. O. A. Johannsen of Ithaca, N. Y., dated November 24, he says:—

"I saw your note in Science this evening with regard to *Muscina pascuorum* and hasten to state that in Ithaca we have just discovered a new Muscina. Tuesday of this week I caught a fly in my laboratory which looked like *M. stabulans* but with black legs. As I was busy with other things I thought no more about it until the next day when Mr. Raymond C. Shannon came in with a fly which he asked me to look at. He realized that it was not one of the two species of Muscinas which were prevalent here. Mr. Shannon has been taking this species in Ithaca now for several days and he told me that there is one (either in his own or in the University collection, I have forgotten which) which was caught here in September. We tried to identify it and reached the conclusion that it was either *pabulorum* or *pascuorum*."

Later Mr. Shannon wrote: "My captures of *Muscina pascuorum* consist of nine females and one male, collected from September 5 to November 22. "On December 16 Jos. C. Ouellet, C. S. V. of Outremont, Quebec, writes:—"I have just received from Father Ducharme of Rigaud College, a specimen which closely resembles *Muscina pascuorum*. I am mailing you the specimen today." The specimen was received on the 20th and proved to be a male of that species and the most northern record.

Over 450 specimens have come under my observation and of these only ten were males. A natural inference is, that this is probably due to their having been discovered so late in the season, and that it is usually the female that comes into the houses to hibernate. On the other hand it was not until November 7 that I saw a male, after over 90 specimens had been seen, and Dr. Wheeler informs me that the specimens he collected in August were taken on flowers.

I can find very little in literature pertaining to the habits of this species. Schiner (Fauna Austriaca, I, 597) says that "Bremi found the larvæ in *Agaricus citrinus*." On making some inquiry regarding the fungi found in the vicinity of Boston, Miss Jennie F. Conant, Secretary of the Boston Mycologial Club, informed me that this is the same as *Amanita citrina*, common to both

Europe and North America. It is found from August to early November, and some of the members of the Club say that it was quite common this year. Charles McIlvaine (One thousand American Fungi, p.7. 1900) considers it only a form of *A. phalloides*. Miss Conant also reported a number of other species of Amanita, including *A. phalloides*, as being common, and as early as July. If *Muscina pascuorum* is strictly fungicolous, the abundance of these fungi might account for the rapid increase of this fly during the autumn.

The wide distribution that this fly has attained in this country before being discovered, makes it difficult to ascertain where the species was actually introduced. The presence of the fly in Connecticut and New Jersey at least two months before being observed in the vicinity of Boston, is an indication that it was probably introduced somewhere near New York City, sometime prior to the present year (1922). This theory is strengthened by the usual or apparently natural line of dispersal of species in a northerly or northeasterly direction, as followed by most of the introduced species; *e. g.*, elm beetle, asparagus beetles, leopard moth, gipsy moth, etc.

Its present distribution would indicate a still wider dispersal if all records were available. Its habit of entering houses would also induce it to enter railroad cars and thus be rapidly and widely transported over the country, a factor that probably partly accounts for its sudden and wide-spread appearance. It promises to be as great a nuisance to housekeepers as the cluster fly (*Pollenia rudis*) which often enters houses in great numbers in the autumn. The last living specimen of *Muscina pascuorum* was received from Dr. Lewis, Waban, Mass., December 14. It will probably continue to appear in lesser numbers during the warm days throughout the winter and spring. A study of its habits and dispersal during the coming year will prove very interesting.

TWO NEW BEMBECIDS (HYMENOPTERA) FROM THE CHANNEL ISLANDS, CALIFORNIA.

By Chas. L. Fox, San Fransico, Cal.

Bembix hamata sp. nov.

Male: Black; labrum, mandibles except apex, broad base and narrow lateral margins; clypeus; lower part of frons between antennal bases (angled dorsally); scape below; broad anterior orbits much shortened above; very narrow posterior orbits, abbreviated above and much shortened below at lower fourth of eye from mandibles; fascia on the first tergite reduced to small subovate lateral spots; narrow undulate fascia on tergites 2-6, usually narrowly interrupted medially, except that on 6 which is continuous and strongly notched on posterior border; small spot on each side apical area of ultimate tergite, sometimes wanting, lateral spots of sternites 2-5, sometimes very small ones on 6, an apical wedge shaped stripe on femora above, longer on anterior pair, tibiæ except black stripe on posterior surface and tarsi, all dull greenish yellow, the tarsi having a rusty tinge. Segments 7-9 of flagellum sub-spinose on posterior border; segments 9-11 bearing large open flat depressions, the ultimate segment a trifle longer than the preceding, only slightly curved, almost as broad at the roundedly truncate apex as at the base; intermediate femora below irregularly serrate-dentate; second sternite bearing a median hooked process distinctly higher than its basal length, much as in *foxi*, the sixth bearing a prominent oblique process narrowed and more produced posteriorly than in *nubilipennis;* this sternite also bearing a similar pair of rounded lateral processes or ridges; seventh sternite with a prominent median carina. Inner margins of the eyes nearly parallel. Flagellum tinged with fulvous below. Wings hyaline, veins dark brown. Head, thorax, median segment, base of abdomen, coxæ, trochanters and femora clothed with dense long pale pubescence, becoming longer and white beneath, the rest of the abdomen shorter-pubescent.

Genital stipites shaped much as in *comata* as shown by Parker (fig. 163) but the inner margin more arcuated before the apical notch, the hairs longer and confined to the inner half of the surface and the basal suture oblique for its whole length, as in Parkers' figure 169. Length 18-20 mm.

Both in the Handlirsch and Parker keys this species runs to *nubilipennis* from which it differs in the size and shape of the body (being very robust) and in the absence of maculation on the thorax, pattern of maculation on the tergites and sternites, color and maculation of the legs, spinose character of the segments of the flagellum, serrate dentations of the intermediate femora, the longer and more dense pale pubescence and the form of the male stipites. In general appearance this species somewhat resembles *amœna*, principally on account of the robustness of the body and the pattern of maculation on the tergites, but from which it can readily be distinguished by the character of the processes on the second and sixth sternites, absence of maculation on the thorax, the much shorter apical spurs on the intermediate tibiæ and the form of the stipites. Like the related species this shows some variation in the yellow marking; two specimens have small spots on the tegulæ and one a larger spot at the inferior angle of the prothorax.

Described from twelve males taken by Mr. E. P. Van Duzee on San Miguel Island, Santa Barbara County, California, May 20, 1919.

Holotype, male, No. 928, Mus. Calif. Acad. Sci.; paratypes in the collection of the Academy and in that of the author.

Type locality; San Miguel Island, Calif.

Bembix hamata subsp., **lucida** subsp. nov.

Male: Black; labrum, mandibles except apex and very narroe base; clypeus, lower part of frons between antennal bases (angled dorsally); anterior orbits, much shortened above, narrow posterior orbits slightly shortened above and below almost reaching base of mandibles; posterior edge of tubercles continued

in a narrow stripe down the sides of the prothorax; tegulæ except apex; fascia on first tergite, very widely interrupted medially, shortened to large elongated lateral spots; fasciæ on tergites 2-5, continous and undulate on anterior border, deeply notched on posterior, that on sixth covering entire tergite except narrow posterior edge; large quadrate spot on apex of ultimate tergite, emarginate anteriorly; lateral spots on sternites 2-6; femora distally above and below; anterior tibiæ except broad stripe below and narrow one above, intermediate and posterior except short stripe below, and tarsi, all greenish yellow. The markings of head and femora below are more of a greenish white (in the species yellow). The segments of the flagellum have the same characters and color as in the species; the intermediate femora are more strictly dentate than in the species. The second sternite bears a large median hooked process (not so high as in the species), and the sixth a shorter and more acute median process and less prominent lateral ridges; seventh with a prominent median carina. The characters of the eyes and pubescence are the same as in the species.

This subspecies can readily be distinguished from the typical form of the species by the maculations on the head, thorax and abdomen and the general clearer color.

Described from one male taken by Mr. E. P. Van Duzee on Santa Cruz Island, Santa Barbara County, California, May 18, 1919.

Holotype, male, No. 929 Mus. Calif. Acad. Sci.

Type locality; Santa Cruz Island, California.

A SINGULAR HABIT OF SAWFLY LARVÆ

By W. M. Wheeler and W. M. Mann.

The following casual observations made in two widely separated South American localities seem worth recording as we have been unable to find any published account of similar behavior among the larvæ of New World sawflies.

July 16, 1920, the attention of the senior author was attracted to a very conspicuous, compact mass of sawfly larvæ crawling like a hugh slug over the short grass and sandy soil along the side of a trail through the jungle near Kartabo, British Guiana. The mass was about ten inches long, four inches broad and two inches thick in the middle. It was elongate elliptical and rather pointed at each end and retained its shape and size unaltered as it progressed like a single organism over the substratum. It consisted of about 200 larvæ, each an inch long and of a deep metallic blue color (Fig. 1). Further investigation of of this singular mass was cut short by a heavy tropical shower. A number of the larvæ were hastily thrown into a vial of alcohol. Although the senior author hoped to find the larvæ in the same locality under conditions more favorable for study, they were not again encountered either by him or by any of the other workers at the Tropical Laboratory.

The junior author had occasion to study a migrating mass of the same or of a closely related sawfly larva during February 1922, on the forest trail between the Mission and the edge of the pampa, near Cavinas on the Rio Beni, in Bolivia. The mass which he encountered was about a foot long, three or four inches broad at the middle, narrowed in front and behind and thickest in the middle. It, too, consisted of more than a hundred dark metallic blue larvæ of the same size as those observed by the senior author. The mass was also moving along as a compact unit and from a distance looked like a gigantic Planarian. When a pair of forceps was thrust into the midst of the larvæ and a number of them thrown out to the side, those in front and behind

slowed up, appeared to be disturbed and jerked from side to side. The ejected individuals immediately headed for the mass and crawled into it and the whole, thus redintegrated, then quickened its pace and was soon moving along as before.

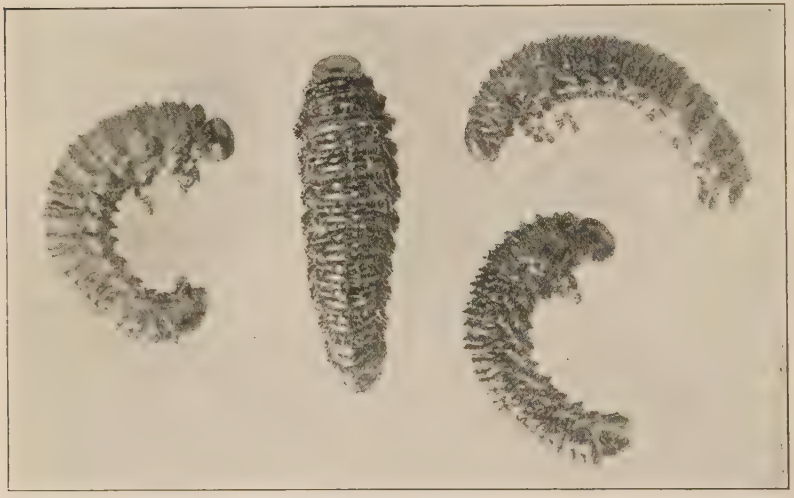

Fig. 1. Sawfly larvae from Kartabo, British Guiana. X 1⅔

Mr. S. A. Rohwer kindly examined a number of the larvæ taken at Kartabo and reported as follows: "I regret that I am unable to help you very much with the identification of these specimens. We know so little about the larvæ of exotic sawflies and especially about those from South America. The only thing I can do is to guess as to the group to which your specimens belong. They remind me very much of the larva of Perga, and as this group is not represented in South America, but is replaced by another subfamily, I venture to suggest that your specimens belong to the family Perreyidæ, subfamily Syzygoniidæ (Philomastiginæ of my classification of 1910). I imagine that the crawling larvæ you saw were in their last feeding stage and were looking for a place for pupation. I should also imagine that they had fed gregariously and that they would cocoon gregariously. Perhaps their cocoons will resemble those of the Australian genus

Perga or those of the subfamily Argiinæ; that is, they would have a single, more or less impervious cocoon surrounded by a loosely woven, reticulate, outer cocoon which would be covered with long hair."

Such literature as we have been able to consult on the habits of the Australian saw-flies of the genus Perga proves to be very interesting in connection with the South American larvæ referred by Mr. Rohwer to the family Perryidæ. Froggatt (1891, 1901 and 1918) has published notes on the larval habits of several species of Perga. Concerning one of them, the "steel-blue saw-fly", *P. dorsalis* Leach, he says (1918): "The gregarious larvæ feed at night, and rest during the day, clustered together in an oval mass, on the stem of the gum-tree upon which they are feeding. When disturbed, they exude a sticky yellow substance from the mouth, at the same time raising the tip of the body, and tapping it down on the foliage. The leaves are devoured from the top of the young gum trees; and when the larvæ are full fed, they crawl down the stem to pupate. I have found them fully developed in the middle of April; but when they descend from their resting place, they wander about over the grass for several days before they finally select a place in which to pupate, generally the softer soil against a tree-trunk. Into this they burrow to a depth of three or four inches, massing their large, oval cocoons in rows, one against the other. I watched several large swarms feeding upon the Peppermint-gums (*Eucalyptus novæ-angliæ*) at our Experiment Station at Uralla, and afterwards in their erratic wanderings over the grass; and marked down their final resting place and dug up the cocoons. At Binalong, in April, I observed two large swarms marching in massed formation; the heads of the hind rows always rested upon those in front as they moved along steadily together. Every now and then, the front rank came to a dead stop, when they all rested for three or four minutes; then a number began raising up and tapping down the tip of the abdomen, whereupon the whole band took up the motion; the leading ranks made a fresh start, and all moved along again. In the largest band, I counted two hundred and fifty caterpillars."

Social tendencies are revealed not only by the Perga larvæ and pupæ, but also in the extraordinary protection of the young larvæ by the mother saw-fly. Lewis (1836) long ago described this behavior in *P. lewisi* Westwood of Tasmania, and Froggatt (1901), who says that this is "the commonest sawfly about Sydney on bloodwood" (*Eucalyptus corymbosa*), records his own observations as follows: "The female makes a double slit on the upper surface of the leaf generally among the young growth, in which she inserts a double row of elongate eggs, which, as they swell form a regular blister, but the most remarkable fact in the life history of this insect is the care she takes after laying her eggs. Nearly all insects after the eggs are laid leave them to their fate, but Lewis' saw-fly not only stands guard over them until they are hatched but further looks after the helpless grubs for some time after they have commenced feeding. She straddles the eggs with her wings half opened, the tip of her abdomen turned up, and with her jaws open, makes a slight buzzing sound if meddled with; if you pick her up, she never attempts to fly, but crawls back to her post, reminding one of an old hen protecting her chicks. The grubs when full grown are slightly under 1½ inches in length, general colour dull brown to dirty yellow, covered with short brown hairs, the last abdominal segment yellow. When full grown they crawl into the ground and form the typical form of cocoon, generally in regular rows."

LITERATURE.

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1918. ..... Notes on Australian Sawflies (Tenthredinidæ). Proc. Linn. Soc. N. S. Wales 43, 1918, pp. 668-726.

TWO NEW ANTS FROM BOLIVIA

(Results of the Mulford Biological Exploration.—Entomology.)

By Wm. M. Mann.

BUREAU OF ENTOMOLOGY, U. S. DEPARTMENT OF AGRICULTURE.

Among the material collected in Bolivia and so far studied, two ants are of especial interest. One belongs to an aberrant undescribed genus of "driver ant" (Dorylinæ) and the other is a Ponerine species very similar to *Probolomyrmex filiformis* Mayr known from workers described in 1901, from Port Elizabeth, Cape Colony. The latter is an example of discontinuous distribution, such as is frequently found among the Ponerine ants, but it is the first case in its subfamily of a South African and South American relationship.

Subfamily Dorylinæ

Leptanilloides gen. nov.

Worker.—Small, slender, monomorphic. Head elongate, subquadrate, anterior portion of front rather strongly impressed. Clypeus short. Frontal carinæ very short, fused between the antennæ, separated anteriorly and bordering the antennal fossæ. Cheeks with a strong carina, which projects forward as a blunt tooth. Mandibles with distinct basal and apical portions separated by a rounded angle. Eyes absent. Antennæ 12-jointed, stout, scape short, funiculus moderately thickened distally,

joints submoniliform. Thorax long, slender and flattened; mesoëpinotum compressed laterally; promesonotal impression strong; mesoëpinotal impression obsolete. Epinotum unarmed. Petiole subcylindrical, not pedunculate. Postpetiole shorter and broader than the petiole. Gaster long and slender, the three segments visible from above separated by strong constrictions. Legs, long spines of anterior tibiæ very strongly pectinate, those of middle tibiæ small, of the posterior pair moderately pectinate. Claws simple.

Genotype.—Leptanilloides biconstricta, new species.

Leptanilloides biconstricta sp. nov. (Fig. 1)

Worker.—Length 1.80-2 mm.

Head subquadrate, very slightly narrowed behind, more than twice as long as broad, sides nearly straight and parallel; occipital corners rounded, border feebly concave. Mandibles slender; their blades edentate. Anterior border of clypeus straight. Antennæ stout, scapes clavate, extending about three-eighths the distance to occipital borders; first funicular joint rounded, broader and longer than the second; joints 2-10 slightly transverse, gradually increasing in size toward apex; terminal joint about as long as the two preceding together. Thorax and epinotum elongate, slender, flat above; pronotum from above broadest at humeri, with sides feebly convex; mesoëpinotum seen from above, quadrate, two and a half times as long as broad, with nearly straight sides; epinotal declivity very short and rounding into the basal portion. Petiolar node from above a little longer and two-thirds as broad as the post petiole, very slightly narrowed from front to rear and with straight sides; in profile slightly convex above, the ventral outline convex at anterior half and concave behind, projected anteriorly as a blunt cone. Postpetiole in profile rather strongly convex beneath, feebly above; from above a little longer than broad, feebly broadened from front to rear, with straight anterior and posterior borders and nearly straight sides. First gastric

segment a little longer than the second or third. Legs long, the femora swollen and the tibiæ enlarged apically.

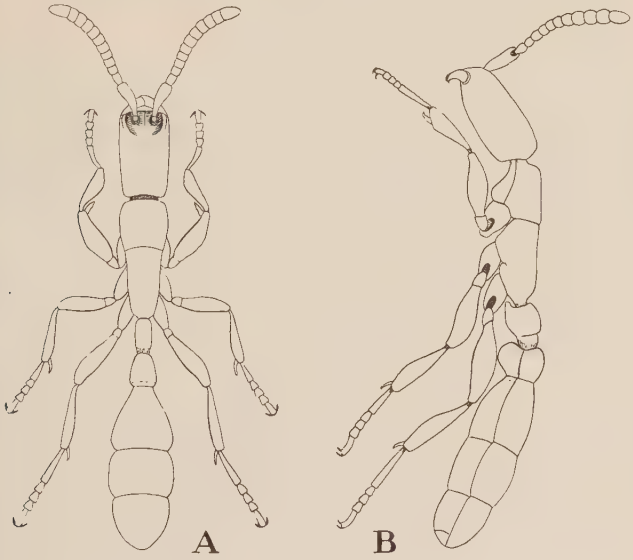


Fig. 1. Worker *Leptanilloides biconstricta* gen. nov. et sp. nov. A, dorsal, B, profile view.

Shining; head with abundant, separated, coarse, punctures; thorax and abdomen with much finer and sparser punctures. Head, body and appendges with abundant, rather coarse, short and erect, brownish hairs.

Color brownish red.

Type-Locality.—Tumupasa, Bolivia.

Cotypes.—Cat. No. 25905, U. S. N. M.

Described from a small series of workers, taken with callows, but without sexual or immature phases, from beneath a deeply embedded stone near a stream.

In general habitus this is very similar to *Leptanilla*, but the structure of the head associates it more closely with *Eciton*, from which it is distinct in the form of the frontal lamellæ, the form of the gaster and in not being polymorphic.

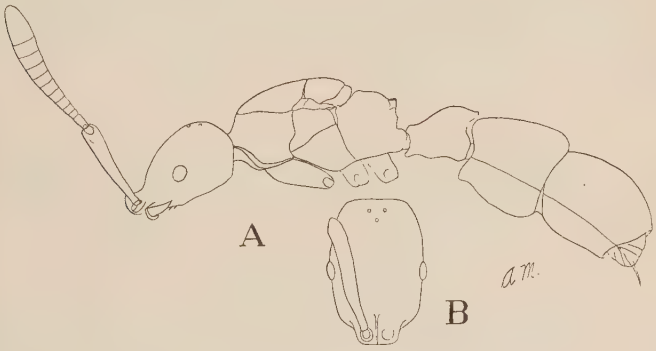
Subfamily Ponerinæ.

Probolomyrmex? boliviensis sp. nov. (Fig. 2).

Female.—(deälated) Length 2.8 mm.

Head about one and one-half times as long as broad, with slightly convex sides, rounded occipital angles and straight border; vertex and posterior portion of head broadly and evenly rounded, anterior part projected as a thick plate, broader than long and truncated in front, completely covering the mandibles. Clypeus on the anterior truncated portion, triangular, not sharply defined. Mandibles small and rather slender, blades rounding into the basal portions, with two indistinct and blunt teeth. Maxillary palpi 3-jointed, the first and second joints subequal in length and together as long as the third. Labial palp small, apparently 2-jointed. Frontal area rather large, feebly impressed. Frontal lamellæ fused into a high, thin plate strongly convex in profile; behind separated and very short. Antennal insertions near front margin of head, bordered by a fine carina. Antennæ 12-jointed, scape extending about four-fifths the distance to occipital corners; funiculus evenly enlarged distally, without club; first funicular joint longer than broad; joints 2-10 transverse; terminal as long as the three preceding joints together. Eyes small, little convex, situated at middle of sides. Ocelli small. Thorax long and rather narrow, moderately convex above and at sides, humeri broadly rounded. Mesonotum one and one-third times as long as broad. Scutellum longer than broad, rounded behind, with feeble impressions at middle of sides. Epinotum with feebly convex base and nearly flat declivity, bluntly dentate at angle. Petiole elongate nodiform; from above, twice as long as broad, with the posterior margin concave at middle and subdentiform at sides; in profile longer than broad and nearly twice as thick behind as in front, its ventral outline bisinuate, with a blunt antero-ventral tooth; posterior surface strongly concave. Gaster slender, strongly constricted between the first and second segments, first segment narrowed in front, shorter than the second, remaining segments small, directed downward. Sting well developed and strong.

Legs long, rather slender, tibial spines coarse, those on posterior pair strongly pectinate.



(Fig. 2. Female *Probolomyrmex? boliviensis* sp. nov. A, profile view; B, head, dorsal view)

Opaque, finely, densely reticulate and in addition with rather coarse, foveolate punctures, especially prominent on the front of head, epinotum and gaster. Pubescence white, very fine, closely appressed, moderately abundant, more so on gaster and appendages.

Brownish red, appendages brownish yellow.

Type-locality.—Rurrenabaque, Bolivia.

Type.—Cat. No. 25906, U. S. N. M.

Described from a unique female found beneath a stone, near a small colony of *Ponera* sp.

In *Probolomyrmex boliviensis* the posterior segments of the gaster are much smaller, the antero-ventral petiolar spine is rounded and points forward and the epinotum is dentate rather than angulate, characters different from those in *P. filiformis* Mayr, but I can find no difference of generic value that would separate the two. In the worker of *filiformis* Mayr the posterior gastric segments are larger, the antero-ventral petiolar spine is lamellate and directed backward and the epinotum is angulate, instead of dentate. Perhaps when the female of *filiformis* or the

worker of *boliviensis* is discovered it will be necessary to separate the two species generically, but the female of the latter resembles *filiformis* so closely, even to the curious Platythyrea-like sculpture, that had it been taken in South Africa, instead of South America, one would be tempted to regard it merely as the female of Mayr's species.

A NEW GENUS OF MYRMECOPHILOUS PHORIDÆ, WITH NOTES ON SOME RELATED FORMS.[1,2]

By Charles T. Brues.

Among the insects obtained by Dr. William M. Mann while a member of the Mulford Exploration in South America, are several species of wingless and subapterous Phoridæ. With the exception of a single species, all were taken in the nests of ants and are undoubtedly myrmecophilous. One, which proves to represent a new genus, occurs with Tranopelta, a hypogæic ant not hitherto known to harbor any phorid myrmecophiles, while the others are ecitophiles previously described from other parts of the South American continent.

The type of the new species is deposited in the United States National Museum.

Tranopeltoxenos gen. nov. (Fig. 1).

Entirely wingless. Head seen from above wide, twice as broad as long; antennæ widely separated, nearly round, their cavities separated; arista very short and thick, indistinctly pubescent; palpi strongly bristled; front with a series of six small, slightly proclinate, bristles along the anterior margin between the antennæ, and with eight macrochætæ disposed in two transverse rows; of these, the anterior row curves forward medially, with its lateral bristle behind the eye and the posterior row lies close to the occipital margin. Eyes very small; ocelli

[1]Results Mulford Biological Exploration.—Entomology.

[2]Contribution from the Entomological Laboratory of the Bussey Institution, Harvard University. No. 215.

absent. Proboscis short, stout, heavily chitinized and porrect. Thorax very short on its dorsal surface (as indicated by a pair of humeral and posterior-lateral macrochætæ) but when the abdomen is bent down, exposing the posterior slope, it is seen to be nearly as long as the head. Abdomen large, ovate, fully twice as wide as the head and broadest at the third segment behind which it tapers obliquely; second to fifth segments each with a row of six long, but not very stout bristles extending across the disc near the middle; sixth with a denser fringe along the margin; sides of all the segments each with several additional bristles. First six segements heavily chitinized, without any membranous borders; following three segments tubular. Abdomen above moderately convex, below flat, so that in cross-section it is very strongly depressed. Legs rather short and stout; four posterior tibiæ ciliate on the edge.

Type: *T. manni* sp. nov.

This insect is quite unique and I cannot place it in any of the described genera in spite of the fact that these are already very numerous. There is no indication of any gland opening on the fifth abdominal segment and the abdomen is heavily chitinized over its entire dorsal surface. It resembles Chonocephalus Wandolleck, but the form of the abdomen is very different. the palpi are very densely bristled, and both the cephalic and thoracic chætotoxy disagree. Chonocephalus, also, so far as is known, is not myrmecophilous.

Tranopeltoxenus manni sp. nov. (Fig. 1).

♀. Length 1.5 mm. Head and its appendages, thorax and legs, pale yellow; first five abdominal segments black or piceous, the sixth segment fuscous, the extrusible ones beyond whitish. Head above covered with sparse, appressed black hairs and at the sides anteriorly below the antennæ with a row of bristly hairs. Bristles of palpi dense, as long as the width of the palpus. Antennæ rather small, the arista but little longer than the diameter of the third joint. Post-antennal bristles rather stout, parallel, proclinate; inner bristles of lower frontal row rather

weak, set far apart, just above the antenna; bristles of upper row very large and curving backward very strongly. Second to fifth abdominal segments of about equal length, the third wider than the second; third and fourth narrower, the base of the fifth only two-thirds as wide as the second; sixth small; seventh to ninth fleshy, completely retractile. Transverse row of bristles

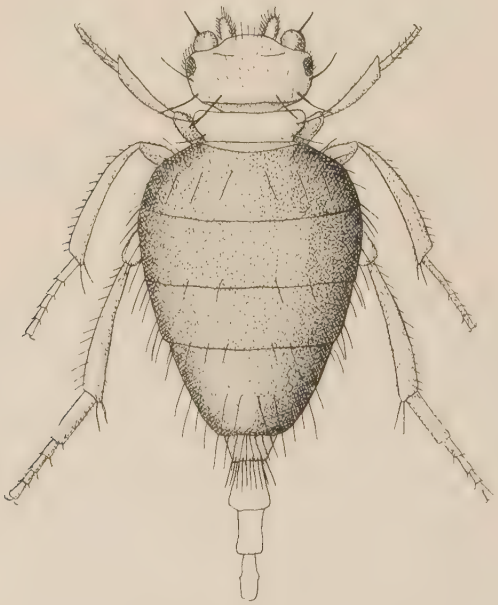


Fig. 1. *Tranopeltoxenos manni* sp. nov. ♀

on second segment placed before the middle, those of the third behind the middle, of the fourth and fifth some distance before the apex; sixth with a dense fringe at the apex.

Described from two specimens, taken in a nest of *Tranopelta gilva*, var. *amblyops* by Dr. W. M. Mann during December 1921 at Tumupasa, Bolivia. Type No. 25904, United States National Museum.

Acontistoptera brasiliensis Schmitz

Zool. Jahrb , Abth. f. Syst. vol. 37, p. 527 (1914)

Dr. Mann obtained this species on two occasions, once at Tumupasa, Bolivia (December 1921) with *Eciton cœcum* and again at Covendo, Bolivia, with the same ant. The type was found with *E. predator* in Santa Catarina, Brazil.

There is a slight disagreement between these specimens and Schmitz's original description, but I think this is undoubtedly due to the poor condition of the type which according to its describer is defective and glued to a card The mesonotum bears a pair of marcochætæ on the disc in front of the pair shown in the original figure; so that there are two pairs of dorso-centrals instead of one. Also the abdomen bears a very small basal plate, elongate oval in form. which is no doubt a vestige of the second tergite which is so large in most of the related genera. The three known species of Acontistoptera may be distinguished quite readily by the form of the thorax which is more or less triangular in all, but varies in width and length. Thus in *A. melanderi* Brues from Texas it is considerably longer than broad, in *A. mexicana* Malloch from Mexico, nearly twice as long as broad and narrowed almost to a point at the base of the scutellum, while in the present species the length scarcely exceeds the width.

Ecitomyia comes Schmitz.

Zool. Jahrb. Abth. f. Syst., vol. 37, p. 524 (*Ecitophora*)

This species is represented by two series, one taken with *Eciton burchelli* at Huachi, Bolivia and the other with *E. cœcum* at the mouth of the Rio Madidi, Bolivia (January 1922).

The specimens all agree exactly with Schmitz's original description and figures, but have no ocelli, and I feel quite positive that the hyaline spots referred to as ocelli are really the points where bristles have been broken off. Compared with *Ecitomyia wheeleri* Brues, *E. comes* may be readily recognized by the complete absence of the second chitinous plate (third tergite) on the abdomen and by the more heavily bristled wings.

Puliciphora venata Aldrich

Trans. Entom Soc. London, p. 436 (1896) (*Phora*).

Brues. Trans. Amer. Entom. Soc., vol. 29, p. 382 (1903). (*Pachyneurella*)

Brues. Bull. Wisconsin Nat. Hist. Soc., vol. 12. p. 142 (1915)

I cannot distinguish a series of females taken at Espia, Rio Bopi, Bolivia from the West Indian form. Dr. Mann's specimens were attracted to masses of old cheese that had been abandoned by the expedition. A number of others in my collection from Grenada, B. W. I. were similarly trapped in jars containing chicken bones to which I found them attracted in great numbers.

THE PROBABLE OCCURRENCE OF PARTHENOGENESIS IN *OCHTHIPHILA POLYSTIGMA*. (DIPTERA)

By A. H. Sturtevant, New York City.

A total of 68 living specimens of *Ochthiphila polystigma* Meigen (one of the Ochthiphilinæ, a subfamily included among the Acalypterate Diptera) was examined between August 23 and September 30, 1922. All were females; and there is no possibility that the males were found but not recognized as belonging to this species, since during that period no other member of the genus was taken. With the exception of a single female belonging to an apparently undescribed genus, the only other members of the subfamily Ochthiphilinæ taken belonged to the very different genus Leucopis, and here both sexes were found. Eleven of the *O. polystigma* females were dissected, and three more were fixed and sectioned. In none of these was any trace of sperm found. I was during this time making a comparative study of the structure of the internal reproductive organs of the females of all the Acalypteræ, and was thus in a position to know how and where to look for sperm. It is safe to

say that none was present. Yet several of these females contained what appeared to be fully formed eggs—in fact in a number of cases there was an egg already in the uterus. Such females, evidently laying eggs but without sperm present, were found as early as August 23 and as late as the middle of September. At both times there were also found females with ovaries still small—these again being without sperm. It seems clear thus that the results are not due to the collecting having been done either at the beginning of a generation, before males had emerged or at the end of one, after the males had mated and died.

In addition to the live females just discussed, I have examined the pinned material in my own collection, in the collection of the American Museum of Natural History, in that of the United States National Museum, and in that of Prof. J. M. Aldrich. All the specimens of *O. polystigma* found in these collections were again females. The data thus obtained (including the live specimens examined) are summarized in Table I.

Table I. Distribution of *Ochthiphila polystigma* Meigen

State or Province	Number of females	Months in which taken
New Hampshire	1	?
Ontario	7	May—?
Massachusetts	89	June—Sept
Connecticut	3	May
New York[1]	4	Sept.
New Jersey	1	Sept.
Pennsylvania[1]	8	Oct.
Maryland	3	Apr.—Aug.
Indiana	10	July—Aug.
Illinois	3	June
Wisconsin	1	July
South Dakota	1	June
Manitoba	2	July
Utah	2	July
Holland	2	June
Total	137	Apr.—Oct.

[1]Two of the specimens from New York and all of those from Pennsylvania were taken by Dr. F. Schrader, and have not been seen by me. Dr. Schrader states that all were females.

In the collections of Prof. Aldrich and of the U. S. National Museum are specimens of four other species of Ochthiphila, identified by Coquillett and by Aldrich. These all include males, as will appear from Table II (which also includes 6 European specimens from my own collection). In all four species the males have large conspicuous external claspers, and could not possibly be mistaken for females. This indicates that the failure to find males of *O. polystigma* is not due to failure to recognize them as males.

Table II Relative abundance of the sexes in Ochthiphila.

Species	♀	♂
O. aridella Fallén	11	11
O. elegans Panzer	12	5
O. geniculata Zetterstedt	1	1
O. juncorum Fallén	5	9

A case very similar to the one just described occurs in *Lonchoptera furcata* Fallén. It was found by de Meijere (1906) that nearly all individuals of this species were females, and that these did not have sperm in their receptacles. In other European species, such as *L. lutea* Panzer, both sexes occur in nearly equal numbers, and sperm is present in the receptacles. The extreme scarcity of males has been confirmed by Lundbeck (1916) for the European *L. furcata*, and by Aldrich (1918) for the American forms, which apparently belong to the same species. Aldrich was able to find only two American males of the genus (one from Ontario and one from Colorado), though he recorded 2652 females.

I have myself collected numerous American specimens of Lonchoptera, and have examined the material in the American Museum of Natural History. Table III shows the result of this study. The five males that appear in the table, and two of the California females as well, appear to belong to a distinct species; all the others (except perhaps the Colorado female) are almost certainly *L. furcata*. I have several times obtained eggs from females of this species, and these have hatched into larvæ; but in

no case have I been able to rear these larvæ, nor have I been able to be sure that the mothers did not contain sperm—though it is extremely unlikely that sperm was present. This observation makes it probable, however, that Lonchoptera reproduces by adult parthenogenesis, rather than by pedogenesis.

Table III. Relative abundance of the sexes in Lonchoptera.

State or Province	♀	♂
New Hampshire	1	0
Vermont	1	0
Massachusetts	53	0
New York	403	0
New Jersey	53	0
Ontario	1	0
Pennsylvania	1	0
District of Columbia	1	0
North Carolina	2	0
Wisconsin	1	0
Colorado	1	0
Santa Clara Co., California	426	0
Monterey Co., California	23	4
Truckee, California	344	1
Total	1311	5

Parthenogenesis has been described in the Chironomid genera Chironomus, Corynoneura, and Tanytarsus by Grimm (1870) Johannsen (1912), Goetghebuer (1913), Edwards (1919), and others. Eggs are produced in some cases by the larvæ, in others by the pupæ, and in still others by the imagines. In all cases in which imagines have been produced by parthenogenetic (including pedogenetic) lines, these have been females and have bred parthenogenetically if at all. Males are known to occur in these genera, and in one case even in a species that reproduces parthenogenetically; but in no case are males reported as arising from larvæ known to have been produced by parthenogenesis.

The first case of parthenogenesis recorded among the Diptera was that of the Cecidomyiid, Miastor, discovered by

Wagner (1863). In this case it is the larvæ that reproduce parthenogenetically. Imagines are not often produced, but when they do appear both sexes are found (Meinert 1864, Wagner 1865, Kahle 1908). Kahle states that there is a significant excess of females, and Felt (1911) describes only the female, though he does not state that males were absent. It is not known whether the imagines breed at all, or not; Kahle states that he did not observe copulation. It does not appear to have been entirely proven that the males arise from larvæ that have been produced by pedogenesis, though most students of Miastor have apparently taken this for granted without making cultures from isolated larvæ.

Parker (1922) has reported a probable case of pedogenesis in the blow-fly, *Calliphora erythrocephala* Meigen, with the production of male and female imagines in something like equal numbers from isolated individual larvæ. Since the actual production of eggs or larvæ was not observed to go on in Parker's larvæ, and since Lowne (1892) and others have dissected large numbers of larvæ of this species without finding mature eggs or larvæ in them, it seems best to withhold judgment for the present as to the occurrence of pedogenesis in Calliphora, as Parker himself indicates.

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PHORTICOLEA BOLIVIÆ, A NEW MYRMECOPHILOUS COCKROACH FROM SOUTH AMERICA.

(Results Mulford Biological Exploration.—Entomology).

By A. N. Caudell.

Bureau of Entomology, U. S. Department of Agriculture, Washington, D. C.

Among the insects collected in Bolivia by Dr. Wm. M. Mann, entomologist with the Mulford Expedition to South America in 1921-1922, was an apparently undescribed myrmecophilous cockroach belonging to the genus *Phorticolea* of Bolivar. Although only males were collected there seems to be no doubt that this generic assignment is correct, as the specimens agree in every essential with the characters given for *Phorticolea*. The size and locality of the new species here described indicate specific distinctness from *testacea*, the type and only described species of *Phorticolea*, though the very brief diagnosis of the latter makes comparative characterization impossible.

Phorticolea boliviae sp. nov.

Description.—Adult male, the opposite sex unknown. General color reddish brown, laterally somewhat darker. Head yellowish with black eyes; vertex evenly convex, not quite concealed beneath the pronotal disk; eyes lateral, subreniform, strongly fasceted and almost or quite three times as long vertically as broad; interocular space fully twice as great as the vertical length of one of the eyes; labial palpus with the terminal segment large, thick, fusiform, about two and one half times as long as the median width and a little more than twice as long as the preceeding segment, which is triangular in shape. Antenna approximately as long as the insect itself and consisting of at least thirty segments[1]; first segment noticeably longer than broad and flattened basally; second and third segments subquadrate, each being about, or a little more than half as long and scarcely

[1]One specimen only of the three examined has both antennae apparently complete and here consists of thirty segments. The other two specimens have the antennae more or less mutilated.

as thick as the basal one; fourth to fourteenth segments transverse, the fourth to the eleventh or twelfth being two or more times as broad as long, the more basal ones especially broad; fifteenth and sixteenth segments subquadrate and the succeeding ones longer than wide, those towards the apex being twice as long as broad, some of them slightly more.

Pronotum about twice as broad as long, broadly rounded anteriorly, truncate posteriorly, the lateral angles rounded and slightly produced posteriorly, as are also those of the meso- and metathorax, which segments are subequal with each other in length and together barely as long as the pronotum. Organs of flight entirely absent. Legs stout; femora fusiform, broad and flattened, the anterior pair somewhat smaller than the others, the intermediate pair about three times as long as the greatest width and the posterior ones a little stouter, being about two and one half times as long as broad; anterior femora armed beneath with a series of fine setiform hairs, the intermediate and posterior ones armed beneath on both margins with a few very minute spinules in the apical portion, so small as to be scarcely noticeable under moderate magnification, a subapical one on each margin being decidedly larger; all the femora have an apical calcar on the cephalic geniculation; tibiæ strongly spinose above, the spines in three series, and beneath with mostly finer hair-like spinules, a couple of larger ones in the cephalic margin of the intermediate and posterior ones; tarsi slender, the posterior metatarsus barely shorter than the combined length of the rest of the segments; arolia present, of medium size.

Abdomen anteriorly about as broad as the posterior width of the metanotum, abruptly narrowing posteriorly and scarcely as long as the combined lengths of the three thoracic segments; there are seven dorsal segments visible exclusive of the supraanal plate; lateral margins straight, the posterio-lateral angles sharp and moderately produced posteriorly; the posterior margins of the segments are subtruncate, that of the one preceeding the supraanal plate concave near each side opposite the insertion of the cerci; supraanal plate somewhat more than twice as broad as long, rather narrowly rounded apically; sub-

genital plate broad and rounded apically; cerci short and very broad, tapering from near the base, about twice as long as the greatest width, apically pointed and without distinct segmentation; styles simple, about two thirds as long as the cerci, subcylindrical in shape, rather bluntly pointed apically and the whole organ about four times as long as the basal width.

The entire insect is beset with short pile, the lateral margins of the abdominal segments, supraanal plate, cerci, styles and legs with stout setæ instead of pilose hairs.

Measurements.—Length, entire insect from front of head to tip of abdomen, about 2.7 mm.; pronotum 1 mm.; posterior femora, 1 mm.; posterior tibia, .8 mm.; posterior tarsus, .7 mm.; posterior metatarsus, .3 mm. Width pronotum posteriorly, 1.8 mm.; metanotum posteriorly, 2.1 mm.; posterior femora medially, .3 mm.

Type locality.—Cachuela Esperanza, Beni, Bolivia.

Described from three males collected in March, 1922, by Dr. Wm. M. Mann in the joint nests of *Crematogaster limata var. parabiotica* Forel *and Camponotus(Myrmothrix)femoratus* Fabr.

Type and paratypes in U. S. National Museum. Catalogue No. 25757, U. S. N. M.

VERBENAPIS - A CORRECTION.

In Psyche, vol. 29, p. 162 (August 1922) the name of the genus of bees, Verbenapis is misspelled. Although the error is quite obvious, Professor Cockerell has reminded me that it might receive the attention of nomenclaturists unless corrected. [Editor.]

A FOSSIL GENUS OF DINAPSIDÆ FROM BALTIC AMBER (HYMENOPTERA)

Contribution from the Entomological Laboratory of the Bussey Institution, Harvard University, No. 220.

By Charles T. Brues.

A small lot of amber insects which I have had for a number of years contains a very extraordinary hymenopterous insect. Several times I have attempted to locate it in one of the recognized families of the order, but I have never been satisfied with the result. It has also been shown to a number of entomologists, none of whom were willing to express any positive opinion concerning its relationships. Several weeks ago it was sent to the hymenopterists of the United States National Museum with a request that they examine it, and I soon received a note from Mr. R. A. Cushman calling my attention to a paper by Dr. James Waterston just received in the current October number of the Annals and Magazine of Natural History wherein he describes an almost exactly similar living insect from South Africa. For the African form Waterston has proposed the genus Dinapsis which he makes the type of a new family, Dinapsidæ. He regards Dinapsis as more closely related to Megalyra than to any known Hymenoptera and from an examination of the fossil insect it seems that he is quite justified in expressing this opinion. Dinapsis is known only from the female, while the amber species is represented only by the male, but the two differ so clearly in wing venation and in the structure of the head and thorax that they cannot be regarded as congeneric. As the amber insect throws much light on the relationship of Dinapsis, it seems appropriate to describe it immediately after the appearance of Waterston's paper.

Fortunately, the fossil specis is beautifully preserved and I able to give a quite complete description.

Prodinapsis gen. nov.

♂. General form and size similar to Dinapsis Waterston. Head slightly broader than the thorax, obliquely narrowed

behind the eyes which are large and pubescent; occipital margin raised, carinate; posterior orbits with a narrow groove; ocelli in a large triangle; vertex with a fine, but clearly impressed median line. Antennæ 14-jointed, filiform, inserted near the clypeus. Mouthparts not visible. Mesonotum about twice as broad as long; without parapsidal furrows but with a deep, complete, crenulate median furrow; inner angles of axillæ not meeting, their edges margined by deeply crenulate grooves and their inner angles connected by a crenulate groove. Propodeum coarsely reticulated and apparently without the more prominent longitudinal carinæ present in Dinapsis. Four anterior legs slender, the hind pair stout, with the femora somewhat swollen and the tibiæ enlarged apically; tibial spurs very small; hind coxæ very large; tarsal claws very small and slender, simple. Abdomen as long as the thorax, elongate oval, with seven nearly equal segments; claspers prominent, projecting downwards and curved forwards, obtusely pointed. Venter convex, the sternites almost as wide as the tergites. Fore wing with a small elongate stigma; subcostal cell broad; radial vein short, curved, leaving the cell widely open; basal half of cubitus present, but the transverse cubiti and recurrent nervure are wanting; two closed discoidal cells; basal cells indistinctly separated as the separating vein is very weak and delicate; nervulus interstitial.

Type: *P. succinalis* sp. nov.

Prodinapsis differs from Dinapsis most strikingly in having the radial cell incomplete, in lacking the transverse cubitus and in possessing two discoidal cells. Also the orbital groove is narrower and the axillæ do not meet at their inner angles

Prodinapsis succinalis sp. nov. (Fig. 1).

♂. Length 2.7 mm. Probably with the head and mesonotum black, the remainder of the thorax dark brown, the abdomen light brown and the legs piceous on the femora and tibiæ; wings hyaline and antennæ with no trace of annulation. Head coarsely shagreened, about one-half wider than long; temples two thirds as broad as the eye, occipital groove dis-

tinctly crenulate; posterior ocelli two-thirds as far from the eye as from one another. Antennæ (Fig. 1c) slightly longer than the head and thorax; scape stout, curved; pedicel globose or but little elongated; flagellar joints of about equal length, all long and slender (probably the basal joints are slightly longer, but they cannot be viewed exactly in the proper plane). Mesonotum and scutellum shagreened; posterior edge of mesonotum straight, the suture not crenulate. Pleuræ and coxæ smooth or finely granulate; mesopleura with a crenulate line along the anterior and posterior edges. Abdominal segments of nearly

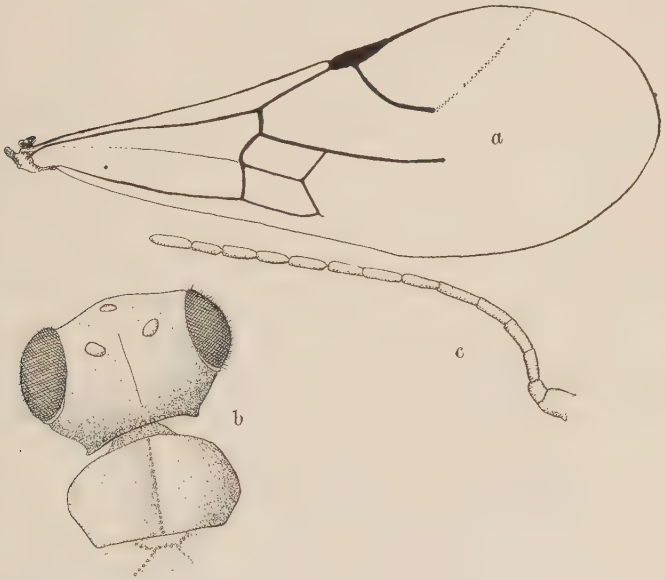

Fig. 1. *Prodinapsis succinalis* sp. nov. A, wing; B, head and anterior portion of thorax, C, antennae

equal length, the second and also the first slightly, but not very noticeably, longer than the others; the posterior edges of the segments sinuous and slightly incised medially. Claspers almost as long as the dorsal length of the sixth segment. Wings ample, the margins with the usual short fringe of hairs, but none of the veins appear to be bristly as in Dinapsis. Venation (Fig. 1a)

rather pale brown, but very distinct, the veins terminating abruptly as indicated; weak apical section of radial vein very indistinct and visible only in certain lights.

Type in the Amber collection of the Zoological Museum of the University of Königsberg.

Taken together the two genera exhibit a much closer affinity to Megalyra than is evident from a knowledge of either Dinapsis or Prodinapsis alone. In fact the neuration of Prodinapsis is almost identical to that of Megalyra except that the basal cells are separated by a very heavy vein in the latter and the apical part of the radius, although not vein-like, is indicated by a much more evident thickening. That the unknown female may be provided with a long ovipositor is also probable. The short and complete radial cell and absence of discoidal cells in Dinapsis give the wing a very different appearance, but the almost exactly similar, yet strikingly characteristic cephalic thoracic and abdominal structure, shows Dinapsis and Prodinapsis to be very closely related. On account of this similarity to Megalyra, it seems very doubtful whether the Dinapsidæ can be retained as a family distinct from the Megalyridæ since the differences are of a very minor nature. In both groups the head, antennæ, medially grooved mesonotum, scutellum with separated axillæ, oval sessile abdomen with more or less equal segments, long thread-like ovipositor and wing venation agree closely in form and structure; only the size is different, for Megalyra is a large insect and the other two genera are very small.

The actual relationship of the three genera is rather difficult to elucidate, since as already stated Megalyra and Prodinapsis have almost identical wings while Prodinapsis and Dinapsis are almost identical in bodily characters, but each with a wing type that cannot be derived one from the other, nor can both be derived from that of Megalyra. If the three are closely related, as seems undoubted, the ancestral form must have had a body like Dinapsis or Prodinapsis and wings with a marginal, cubital, two basal and two discoidal cells. Such an insect must have been more or less Oryssoid in many somatic and venational

characters although perhaps only superficially similar. The median thoracic suture so pronounced in Dinapsis and Prodinapsis occurs elsewhere, so far as I am aware, only in certain Ceraphronidæ, Scelionidæ and Belytidæ of the Serphoid series where it may or may not be associated with the paired parapsidal furrows, although a few Bethylidæ and the Ampulicidæ have a median pronotal (not mesonotal) furrow. In Megalyra it is prominent and undoubtedly homologous to the one in Dinapsis.

Recent Books.

In these lists are included titles relating entirely or directly to insects, as well as books in the related fields of biology which are of immediate interest to the Entomologist.

Folsom, J. W. Entomology, with Special Reference to its Ecological Aspects. pp. 502, extensively illustrated. P. Blakiston's Son & Co. Philadelphia, 1922. A third edition of this well known and useful text, containing much new material, and needing no introduction to American entomologists.

Parker, G. H. Taste, Smell and Allied Senses in the Vertebrates. pp. 192, illustrated. J. B. Lippincott Co., Philadelphia $2.50. Relates specifically to the vertebrates from the standpoint of both anatomy and physiology and presents material that the entomologist will find very useful.

Rousseau, E. Les larves et nymphes aquatiques des insectes d'Europe. vol. 1, pp. xx 967, 344 figures. J. Lebèque, Brussels. The first volume includes the Rhynchota neuropteroids and Trichoptera. A very complete and well illustrated compendium on the biology, morphology and classification of the aquatic members of these groups, with extensive bibliographical references.

Bouvier, E. L. The Physic Life of Insects. English translation by L. O. Howard, pp. XVI†377 New York, The Century Co.

Dr. Howard has made available to the English-reading public, in a most excellent translation, Bouvier's highly entertaining and stimulating treatment of insect-behavior.

Lavier, Geo. Les parasites des invertébrés hématophages; parasites qui leur sont propre; parasites qu'ils transmettent aux vertébrés. 218 pp. illus. Paris, Vigot Frères, 1921.

A very complete account of the microparasites of blood-sucking insects and of their relations to disease in man and other vertebrates.

PROCEEDINGS OF THE CAMBRIDGE ENTOMOLOGICAL CLUB

March 14, 1922, Mr. C. W. Johnson showed a collection of New England Hippoboscidæ and gave an account of their habits, classification and distribution. See vol. 39, Nos. 4-6.

Mr. W. J. Clench showed the milkweed beetles *Tetraopes tetraophthalmus* and *canteriator* and a supposed hybrid between them.

Prof. W. M. Wheeler told about a mass of saw-fly larvæ, which he had observed in South America, moving slowly through the wet grass like a single animal. Mr. C. W. Johnson called attention to a similar habit in the dipterous genus Sciara in which the larvæ cluster together in a long narrow mass which moves along like a worm. See vol. 29, Nos. 4-6.

April 11, 1922. Mr. F. Waldo Dodge showed a collection of over a hundred species of the coleopterous family Tenebrionidæ. He also gave an account of the common species of Coccinella, illustrated by drawings.

Several members discussed the food-habits of Dragon-flies. Mr. Frost said that while collecting he had been protected from mosquitoes by Dragon-flies as long as he remained in sunshine. Mr. Dodge described the catching of Cicindela by Dragon-flies; he said the beetle could defend itself by standing on end and offering only its head and mandibles to attack.

Mr. Roland Hussey gave an account of the hemipterous bugs of the genus Triatoma. See Psyche Vol. 29 No. 3.

Mr. C. W. Johnson described a Tipula from Mt. Washington in which the venation of the wings differed on the two sides in ways previously considered characteristic of different species.

The committee on public lectures reported that six lectures had been given as follows:

February 18. L. O. Howard. On the work of the Bureau of Entomology with special reference to the Gipsy Moth and other injurious insects of local interest. February 25. Wm. T. M. Forbes. On the Butterflies and Moths. March 4. J. Chester Bradley. On Some Habits of Wasps and their relatives. March 11. C. T. Brues. On Mosquitoes and other insects as carriers of disease. March 18. Miss Edith M. Patch. On the Seven Lives of an Elm Aphis, *Erisoma lanigerum*. March 25. J. H. Emerton. On the Spiders, their structure, habits and relations to Insects.

The lectures were fully illustrated by lantern slides and by the new motion-pictures of insects of the Society for Visual Education. Audiences of about one hundred persons attended and paid half the expense of the course, the rest being met by subscription among members of the Club.

May 9, 1922 Prof. W. M. Wheeler read a paper on the distribution of the genus Formica in the tropics. See Psyche Vol. 29 Nos. 4.

Mr. C. W. Johnson described two new dipterous flies from Mt. Desert, Maine and other New England localities.

Mr. R. H. Howe, Jr., remarked on recent collections of Dragon-flies, especially the formerly rare *Williamsonia lintneri*, several of which have lately been taken near Boston.

Miss Butler exhibited an unidentified larva found in Michigan in considerable numbers among eggs of Tabannus flies on leaves of *Typha latifolia*.

June 13, 1922 Mr. Denton showed May-flies found in great numbers near ponds and collected by handfuls beneath the hood of his automobile.

Mr. C. A. Frost showed recently collected Coleoptera.

Prof. Brues gave some notes on food plants of the Colorado potato-beetle, especially *Solanum rostratum*.

Prof. W. M. Wheeler showed some wingless Hymenoptera of the genus Scleroderma from Texas which feed on soft larvæ of any kind, raise a brood in a month's time and can be kept in confinement. It has winged and wingless forms of both sexes and appears to be an attractive subject for genetic studies

September 12, 1922 Mr. O. E. Plath gave an account of his observations on Bumblebees begun in 1921 and continued through the summer of 1922, during which time thirty-seven colonies were kept in boxes and watched through the season. In most of the nests Atherophagus beetles were found, sometimes attached to the feet or antennæ of bees. Chelifers were found in considerable numbers in one nest. The parasitic bees, Psithyrus, were found in several nests and new observations made on their habits and relations to their hosts. See vol. 29, Nos. 4-6.

October 10, 1922 the list of members was read and corrected. The death was announced of Laurence R. Reynolds, Vice-president of the Club, and a well known student of the Coleoptera. He had been on a collecting trip to the West Indies and Venezuela from which he returned in poor health and died in Boston, October 9. Mr. C. W. Johnson gave an account of his summer collecting at Mt. Desert in June and again in September and at the Rangeley Lakes, Maine. Mr. Johnson also discussed a collection of insects made by Owen Bryant in Vermont near Mt. Mansfield. Mr. J. H. Emerton spoke of his collecting in July in

eastern Maine where successful photographs were made of the webs of *Theridion zelotypum*, a spruce-forest spider, and where *Leinyphia nearctica* had been found in a bog at South Gouldsboro fifty miles farther south than any previous record.

November 14. 1922 Dr. J. W. Chapman, who had returned from six years residence in the Phillippines, read a paper by himself and Prof. Wheeler on the mating of ants of the genus *Diacamma* of which no winged females are known. See vol. 29, Nos. 4-6. Dr. Chapman afterwards showed some lantern slides and gave an account of the country near Dumaguete where he had been living.

Mr. C. W. Johnson gave an account of the recent occurrence in large numbers of the European fly *Muscina pascuorum* which had been reported at various places in the eastern United States. See vol. 30, No. 1.

Prof. C. R. Crosby of Cornell University told about the Extension Entomological work in New York State by which entomologists of the State College of Agriculture are kept in touch with farmers, information in regard to injurious insects collected and remedies recommended.

December 12, 1922 Dr. Alice M. Boring of Wellesley College read a paper on the chromosomes in the germ cells of the two varieties of the frog-hopper, *Monecphora bicincta*. No differences were found.

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